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Patent Abstracts of Japan

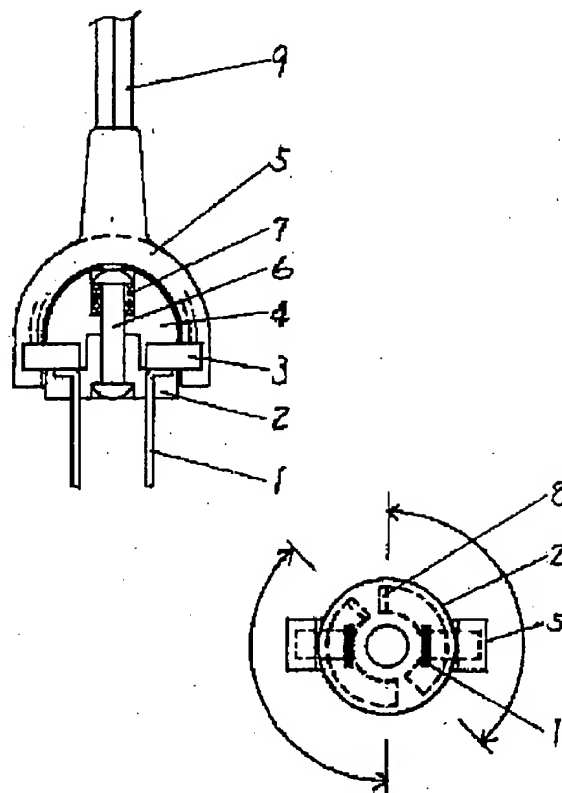
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APPLICANT : IMANISHI HIROSHI;
 INVENTOR : IMANISHI HIROSHI;

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TITLE : RECEPTACLE PLUG CAPABLE OF
 BEING FREELY CONNECTED IN
 UPPER AND LOWER AND CIRCULAR
 DIRECTIONS



ABSTRACT : PURPOSE: To prevent fatigue break of the core wire and the clad of a covered cable connected to a receptacle plug by providing a slider capable of being freely connected at any position in its circular direction and a rotatable mechanism swinging in upper or lower direction.

CONSTITUTION: A receptacle plug is an electrode to be inserted into a receptacle fixing electrode to give an electrical connection and its one end has an annular sliding electrode plug 1 which forms an annular electrode. A fixing holding part 2 fixes and holds the plug 1. An upper and lower and circular direction contact electrode slider 3 has a cable core branched in both poles and connected thereto and makes, slidably contact with the electrode plug 1 in a circular shape along the plug 1 and can be selectively positioned at any of upper, lower, right or left position. A flexible cable clamp 5 is selectively positioned at any of upper, lower, right or left position. A rotation limit stopper 8 is a stopper for acting when the slider makes circumferential rotation along the annular sliding electrode. Since the plug has a clamp 5 and an electrode slider 3 capable of being selectively positioned at any position in upper lower and circular direction fatigue break of the core wire and the clad of a connection cable 9 is prevented.

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(71) 出願人 592155717

向井 憲明

京都府八幡市男山八望1番地c10-503

(71) 出願人 592043469

今西 広視

京都府八幡市美濃山幸水15番地2

(72) 発明者 向井 憲明

京都府八幡市男山八望1番地C10-50

(72) 発明者 今西 広視

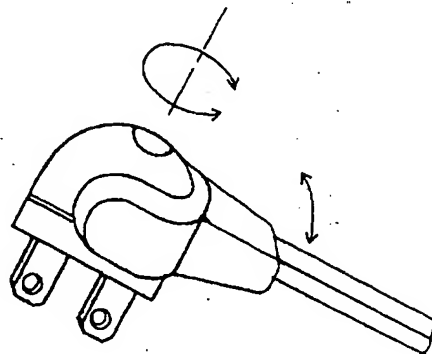
京都府八幡市美濃山幸水15番地2

(54) 【発明の名称】 上下円周方向に自在に接続可能なコンセントプラグ

(57) 【要約】

【目的】 電気コンセントプラグに接続した被覆ケーブルの芯線及びケーブル被覆の疲労破断を防止すること。

【構成】 固定した挿入電極と接続された環状電極を有する固定部分と電氣的に接続するための可動部に円周状に旋回する上下円周方向接触電極軸を具備すると共に、尚且つ上下あるいは左右に角度を可変できる機構を具備することによりコンセントプラグをコンセントに挿入する際にプラグに接続されているケーブルの導入方向に対して自然な角度や機械的な疲労による応力がケーブルのプラグ固定部位付近に負荷されない任意な位置を選択できる構造を有し、ケーブルの芯線の切断、あるいはケーブル被覆の亀裂などによる絶縁不良を防止する構造を有する上下円周方向に自在に接続可能なコンセントプラグ。



【特許請求の範囲】

【請求項1】 電気接続部において挿入電極と環状の摺動電極を有し円周方向に任意の位置で自在に接続できる摺動子を有するコンセントプラグ。

【請求項2】 電気接続部において摺入電極と環状の摺動電極を有し円周方向に任意の位置で自在に接続できる摺動子を有するコンセントプラグで上下に首振り機構を有するコンセントプラグ。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は電気機械の電気接続部に電源の接続用として、又は信号線の接続用としてケーブルの固定部位付近に不自然な機械的応力を生ずることを防止してケーブルの折損を防ぐことを目的として、電気機械本体の固定電極（以下コンセントという）と電源供給系統の先端部固定電極（これも固定電極であるので以下、コンセントという）の相互間接続、又は電気機械本体に直付けされている電源ケーブルを電源供給系統の先端部コンセントとの接続、あるいは信号線の接続の際に電気機械本体に固定された固定電極（これも固定電極であるので以下コンセントという）と建物に固定された信号線の先端部固定電極（これも固定電極であるので以下コンセントという）の相互間接続、あるいはその他の電気機械の固定電極等との接続用として挿入電極（以下プラグという）とコンセントとの接続用に使用するケーブルコンセントプラグとして使用し、ケーブルの芯線破断を防止すると共に、ケーブル被覆の損傷を防止し絶縁不良を無くし、安全にして安定した電気ケーブルの接続分野に使用するのであります。

【0002】

【従来の技術】 従来のコンセントプラグは固定側のコンセントとプラグ側が常に固定された状態で接続されており反復継続して使用していると、プラグ側に接続しているケーブルがプラグとの固定部位の所で、ねじ曲げられる応力が加わりケーブル被覆内部の芯線が切断すると共に被覆も破断するという弊害がありました。

【0003】

【本発明の解決しようとする目的】 本発明は従来の電源と電気機械、信号線と電気機械の接続部のプラグ側に接続しているケーブルの反復継続的な使用による機械的疲労による芯線の切断を防ぐことを目的として、プラグ本体と接続しているケーブルが、上下左右、円周上任意の自由な位置で、より自然な形で一体化することにより、ケーブル芯線に機械的な応力が加わることを防止して芯線や被覆の機械的な疲労による切断をふせぐことを目的としています。

【0004】

【本発明の実施例を示す】 1はコンセント固定電極に挿入して電氣的に接続するためのプラグ電極であると共に、片方の端部は環状の電極を形成している環状摺動電

極プラグを示しています、2は環状摺動電極プラグを構成するための固定保持部であり、3はケーブル芯線を両極に分岐して接続すると共に、1の環状電極部に沿って円形状に摺動接触すると共に、上下あるいは左右の任意の位置に選択できる上下円周方向接触電極摺動子であり、4は円周方向回転可動部であり、5は上下円周方向に任意の位置を選択できるフレキシブルケーブルクランプを示し、6は環状摺動、挿入電極プラグ固定部と上下円周方向に任意の位置を選択するための可動部を連結するための連結ピンであり、7は固定側の環状摺動、挿入電極と上下円周方向に任意の位置を選択できる上下円周方向電極摺動子を電氣的に押圧接触接続すると共に固定部と可動部を弾性をもって機械的にも構成するための押圧スプリングであり、8は環状摺動電極を摺動子が摺動接触しながら円周回転する際の回転限界ストッパーであり、9は被覆電線ケーブルを示しています。本案において、電気機械の設置されている方向から電線ケーブルは使い勝手の良い経路、あるいは自然な方向からコンセントの位置する所まで導かれプラグを介してコンセントと接続されますが、従来のコンセントとプラグの場合はいずれも固定のためにプラグ側の挿入電極は挿入方向に制約を受けることとなり、結果としてケーブルとプラグの固定部位付近において機械的強度の弱いケーブルに曲げ疲労の応力が加わり被覆内部の芯線を切断したりして外観上一見して異常の見られない断線事故を発生したり、ケーブル被覆に亀裂を発生したりして絶縁不良を生じることがありました。本案プラグにおいては、挿入電極と環状電極を有し、上下円周方向に任意の位置を選択できる電極摺動子を具備しているために、電気機械の設置されている方向からコンセントに導かれているケーブルは固定されたコンセント電極位置に対して方向性をもって挿入電極を介して電氣的に接続されますがケーブルの引き込み方はプラグの可動部の首振り角度や、円周角度が任意の位置に設定することができるためにケーブルとプラグの固定部位付近で機械的強度の弱いケーブルに機械的応力が発生しにくい構造となっており、従来のような芯線だけの切断でケーブル被覆の外見に異常の見られない事故や、被覆自体に亀裂を生じたりすることによる絶縁不良事故を防止することができ、コンセントと電気機械のケーブルプラグ接続を正常にして安全で安定した電氣的な接続を実現できるのであります。

【図面の簡単な説明】

【図1】 上下円周方向に自在に接続可能なコンセントプラグ正面断面図

【図2】 上下円周方向に自在に接続可能なコンセントプラグ側面図

【図3】 上下円周方向に自在に接続可能なコンセントプラグ平面底面図

【図4】 上下円周方向に自在に接続可能なコンセントプラグ斜視図

(3)

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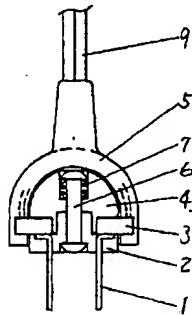
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【符号の説明】

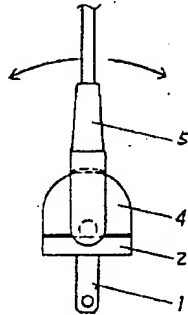
- 1 環状摺動電極プラグ
- 2 環状摺動電極プラグ固定保持部
- 3 上下円周方向接触電極摺動子
- 4 円周方向回転可動部

- 5 フレキシブルケーブルクランプ
- 6 連結ピン
- 7 押圧スプリング
- 8 ストッパー
- 9 接続ケーブル

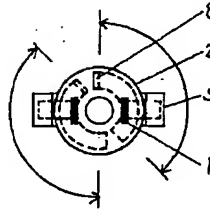
【図1】



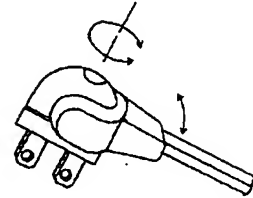
【図2】



【図3】



【図4】



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(71) Applicant
G. Bargellini & C SpA (Italy),
Via Carbonara 1, Pieve Di Cento (Province of Bologna),
Italy

(72) Inventor
Giulio Bargellini

(74) Agent and/or Address for Service
Marks & Clerk, 57-60 Lincoln's Inn Fields,
London WC2A 3LS

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E2F BD
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(56) Documents cited
None

(58) Field of search
H2E
F4B

(54) Device for connecting rechargeable batteries to electric sockets

(57) A body (1) for accommodating rechargeable batteries is connected to a plug (4) by a ball joint having limited motion. The body (1) includes a seat (3) for a ball (7) fixed to the plug (4) by a shank (5). A slot in the body for the shank (5) extends over an arc of 90° so as to permit rotation of said plug (4) between a position of alignment on the device body (1) (phantom lines) and a connection position orthogonal to the former (solid lines) whereat the plug (4) projects laterally out of the body (1) for connection to an electric socket. A pin (16a,b) diametrically led through the ball (7) is guided within grooves formed internally of the seat (3), thereby to allow rotation of the plug (4) around its shank (5) between the connection position proud of the device body (1) and a further connection position orthogonal to the former.

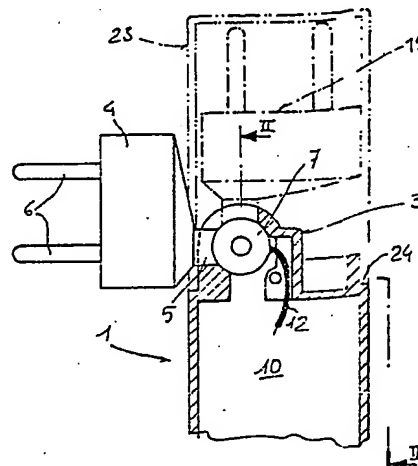


FIG. 1

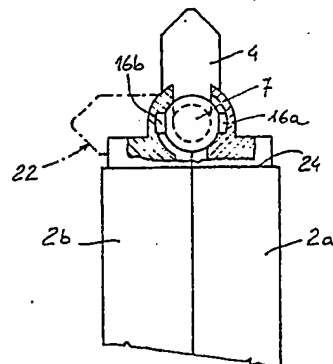


Fig. 2

FIG. 3

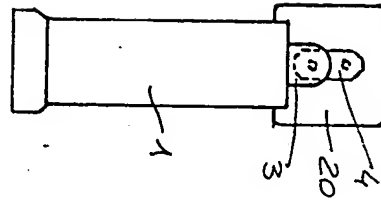


FIG. 3

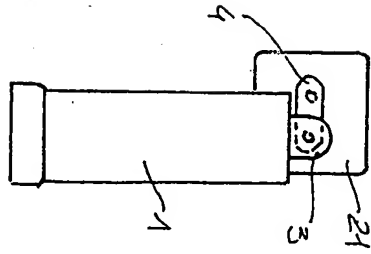


FIG. 4

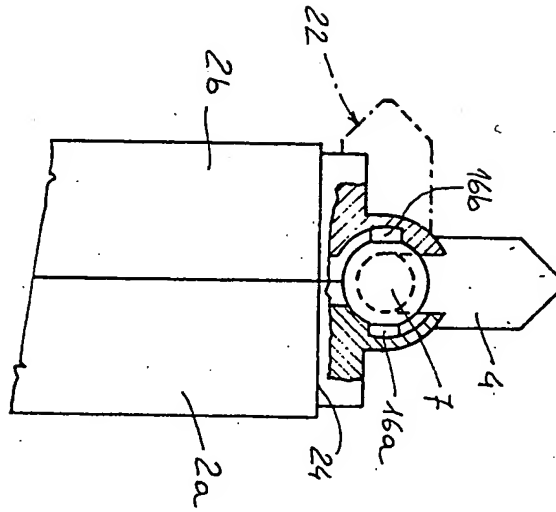


FIG. 2

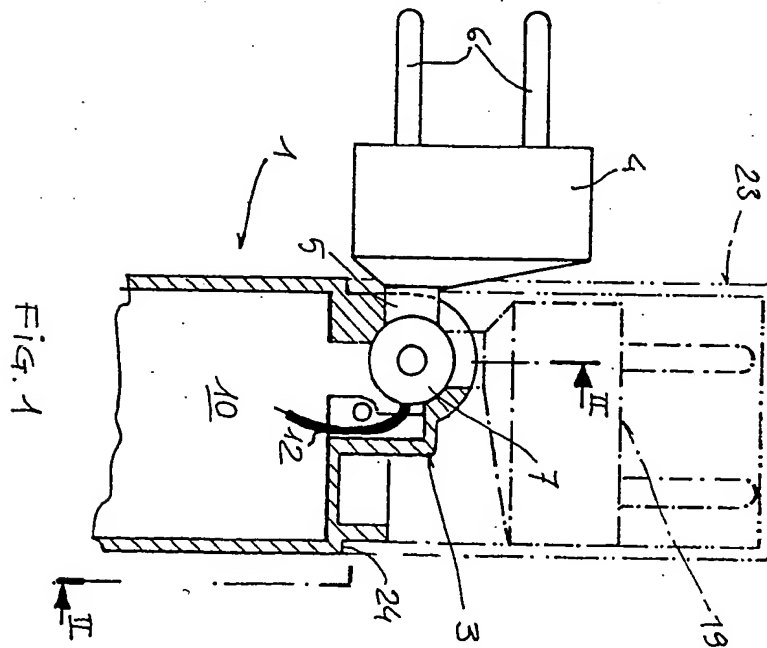


FIG. 1

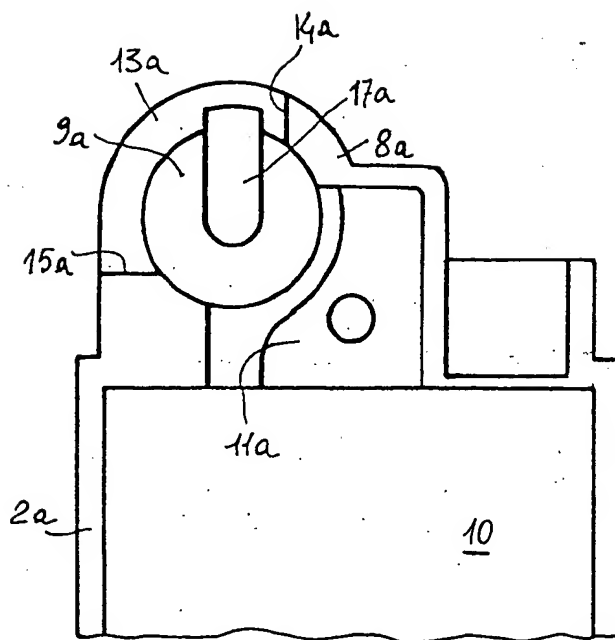


FIG. 6

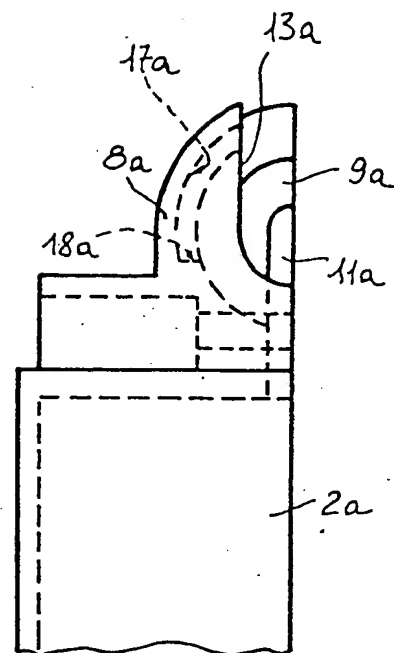


FIG. 5

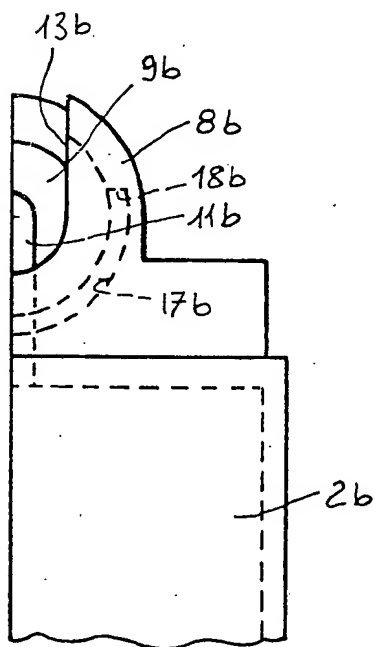


FIG. 7

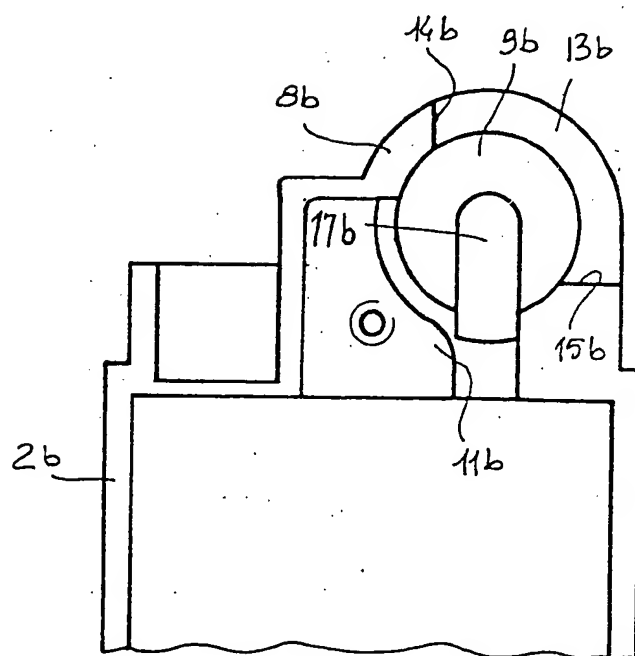


FIG. 8

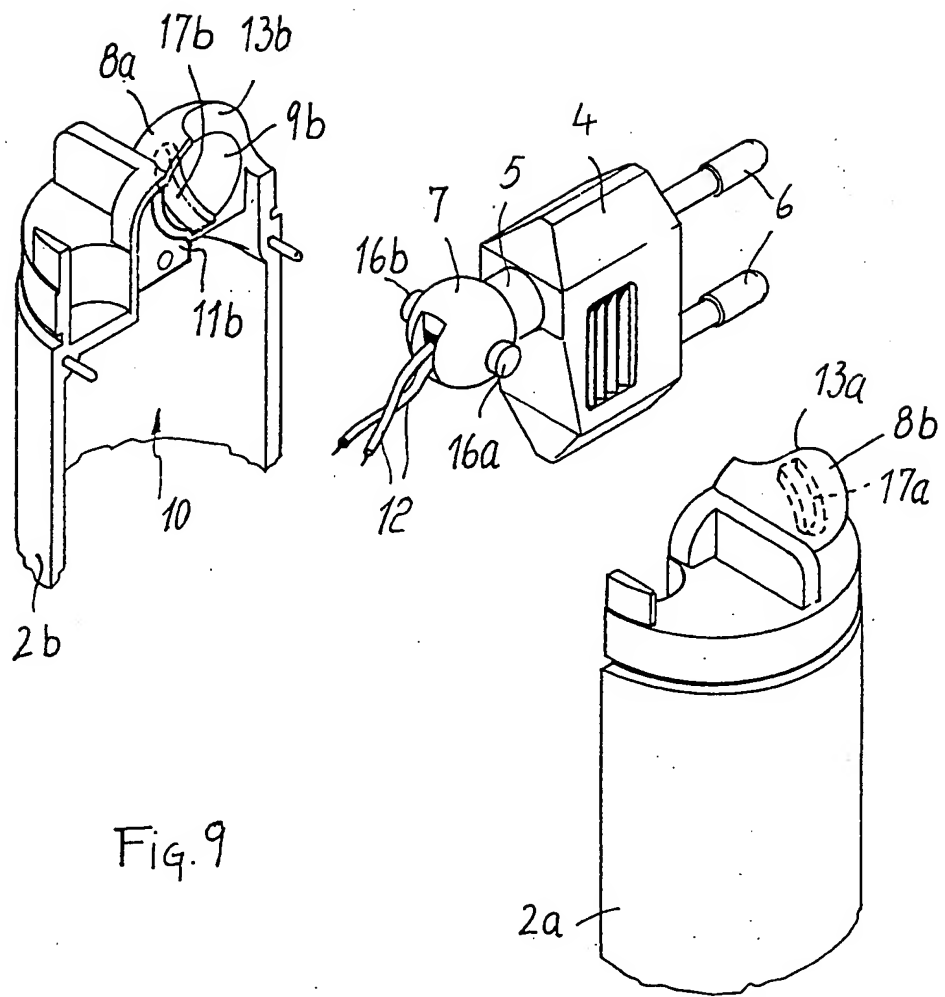


Fig. 9

SPECIFICATION

Device for connecting rechargeable batteries to electric sockets

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This invention relates to a device for connecting tools equipped with rechargeable batteries to wall-mounted electric sockets.

Currently known are rechargeable electric batteries which are employed to power small tools, such as in particular flashlights.

The technical problem encountered in designing such rechargeable flashlights is the method of connecting them to the electric mains for recharging without this requiring the availability of a separate wire lead. In fact, the flashlight cannot be connected directly to a wall-mounted socket in a horizontal position because, owing to its substantial weight attributable to the batteries themselves, a bending moment would arise which cannot be sustained by the connection. Furthermore, the flashlight would extend excessively proud of the wall and be likely to get damaged by people banging into them.

It is the aim of this invention to solve the cited problem by providing a connection device which affords direct connectability of the tool to a wall-mounted socket in an upright position.

Within that aim, it is an object of the invention to provide a connection device of simple design, limited bulk, and easy and versatile to use.

That aim and that object are achieved, according to the invention, by the present device for connecting rechargeable batteries to a wall-mounted electric socket, which is characterized in that it comprises a body for containing said rechargeable batteries which has a spherical seat at one end, and an electric plug which is associated rotatably with said seat by ball means rigid with the plug itself through a shank led through a slot in said seat which extends on a longitudinal plane to said body, so as to permit of an angular rotation of said plug between a position of alignment on said body and an orthogonal position to the former whereat the plug protrudes laterally from said body for connection to said electric socket.

The invention will become more clearly apparent from a detailed description of a preferred embodiment of the connection device for rechargeable batteries, with reference to the accompanying illustrative drawings, where:

Figure 1 is a longitudinal section view of this connection device;

Figure 2 is a sectional view of the device taken along the line II-II of *Figure 1*;

Figures 3 and 4 illustrate diagrammatically the connection of a tool to a wall-mounted socket having vertically and horizontally aligned holes, respectively;

Figure 5 is a front view of a first half-shell of the device body;

Figure 6 is a side view of the half-shell interior;

Figures 7 and 8 show a corresponding front and side view, respectively, of a second half-shell of the device body; and

Figure 9 is an exploded view of the device.

With reference to the drawing figures, the device comprises a tubular body, comprehensively indicated at 1, which forms the cylindrical case of a flashlight and on the interior whereof conventional rechargeable batteries are to be accommodated.

The body 1 is longitudinally divided so as to define two half-shells 2a, 2b which are substantially symmetrical to each other and form at one end a spherical seat 3 for swivel connection to an electric plug 4. The plug 4 has a shank 5 which is practically aligned to one of the pins 6 of the plug, and accordingly, offset with respect to the latter. The shank 5 carries at its end a ball 7 which is rotatably mounted in the seat 3.

The seat 3 is defined by two caps 8a, 8b which extend from the half-shells 2a, 2b and form hemispherical chambers 9a, 9b, respectively, which are complementary of the ball 7. The seat 3 is offcentered with respect to the longitudinal axis of the tubular body 1.

The chambers 9a, 9b are in communication with an inner cavity 10 of the body 1 through related inner cutouts 11a, 11b in the caps 8a, 8b, through which the connection cables 12 of the plug 4 to the rechargeable batteries are passed (see *Figure 1*).

The shank 5 of the plug 4 is led through a slot in the seat 3 which extends on the mating plane of the half-shells through an angle of 90°. One half 13a of the slot is formed in the cap 8a and the other half in the cap 8b. The opposed end edges of the slot form shoulders 14a, 14b and 15a, 15b which limit the rotation of the shank 5 between two positions at 90° from each other, whereat the shank 5 is respectively coaxial with and perpendicular to the body 1. In the position perpendicular to the body and limited by shoulders 15a, 15b, the shank 5 can only turn by 90° around its axis. In fact that rotation is constrained by a diametrical pin protruding bilaterally from the ball 7 with related portions 16a, 16b which engage in respective grooves 17a, 17b formed on the internal walls of the caps 8a, 8b of the seat 3 and being diametrically juxtaposed to each other. The grooves 17a, 17b extend on a longitudinal plane orthogonal to the mating one of the half-shells 2a, 2b, substantially over a quarter of a circumference from relating shoulders 18a, 18b. Therefore, when the plug 4 is disposed on the longitudinal midplane of the body 1, i.e. on the mating plane of the half-shells 2a, 2b, the pin portions 16a, 16b abut against the shoulders 18a, 18b, as suitably rounded off.

Thus, by virtue of the slot 13a, 13b, the plug 4 is rotatable in said longitudinal plane between a position of alignment to the body 1, shown by the dash line 19 in *Figure 1*, and an orthogonal position to the former, whereat it protrudes laterally of the body 1. In that second position, the pin 4 is intended for connection to a conventional wall-mounted electric socket for recharging the batteries.

As shown diagrammatically in *Figure 3*, where the electric socket is indicated at 20 and has vertically aligned holes, in the position of connection to the socket the body 1 is placed vertically flush with

the wall and originates, therefore, no bending moments.

Where, on the contrary, the electric socket has horizontally laid holes, as at 21 in Figure 4, after turning the plug 4 into the outwardly protruding position, it is further rotated by 90° about the axis of the shank 5, as shown by the dash line 22 in Figure 2.

This further rotation is guided by the grooves 17a, 17b wherein the portions 16a, 16b of the pin slide. Also in this case, therefore, it is possible to place the body 1 vertically in the connected position to the socket, without bending moments, acting on the body 1.

It should be noted that in the connected position the plug 4 protrudes fully out of the body 1 and may thus be connected also to recessed sockets in the wall.

It should also be pointed out that the constraint imposed on rotation of the plug 4 by the slot 13a, 13b and the grooves 17a, 17b of the spherical seat 3 prevents the shank 5 from rotating beyond the 90° angle and hence the small cables 12 of connection for the rechargeable batteries from becoming twisted. The offsetting of the articulation fulcrum of the plug 4 with respect to the body 1, on the rotation side of the plug, allows a reduction in length of the shank 5 and minimization of the connection device axial bulk. A central fulcrum would in fact require a not negligible lengthening of the shank 5 to arrange, as mentioned, for the plug to protrude fully out of the device body in the position for connection to the socket.

Conveniently in the aligned position the plug 4 is covered by a cover, indicated by the dash line 23 in Figure 1, which fits over a suitable annular shoulder 24 of the body 1.

The body 1 wherein the batteries are housed may from a set by itself hooked on the reflector of the flashlight and withdrawable therefrom for recharging the battery.

CLAIMS

1. A device for connecting rechargeable batteries to an electric socket, comprising a device body for housing therein rechargeable batteries, an electric plug, and a ball joint connecting said device body and said electric plug, said ball joint having ball means, a connection shaft rigid with said ball means and a spherical seat rotatably accommodating therein said ball means, said spherical seat defining at least one peripheral elongated slot, said connection shank extending through said peripheral elongated slot and sliding therealong, thereby allowing relative rotation of said plug and said device body between a first position, wherein said plug is aligned to said device body, and a second position, substantially orthogonal to said first position, wherein said plug protrudes laterally out of said device body for connection to an electric socket.

2. A device for connecting rechargeable batteries to an electric socket, comprising a device body for housing therein rechargeable batteries, said de-

vice body defining a longitudinal plane and having a spherical seat, an electric plug, a shank rigid with said plug, ball means rotatably accommodated in said spherical seat and rigid with said shank, a slot in said spherical seat extending on said longitudinal plane, thereby said plug rotating between a first position of alignment to said device body and a second position substantially orthogonal to said first position, whereat said plug protrudes laterally out of said device body for connection to an electric socket.

3. A device according to Claim 2, wherein said ball means have protruding portions diametrically extending from said ball means, and said spherical seat has diametrically juxtaposed grooves accommodating therein and guiding said protruding portions, thereby permitting a 90° rotation of said plug around said shank between said second position and a further connection position orthogonal to said first and second positions.

4. A device according to Claim 2, wherein said spherical seat is offcentered to a middle axis of said device body.

5. A device according to Claim 2, wherein said spherical seat is offcentered to a middle axis of said device body of a space and said shank is offset to a middle axis of said plug by a distance substantially equal to said space thereby allowing the longitudinal alignment of said plug to said device body.

6. A device according to Claim 3, wherein said diametrically juxtaposed grooves extend substantially over 90° each and define abutment shoulders for said protruding portions.

7. A device according to Claim 2, wherein said spherical seat has an opening communicating with an inner cavity defined in said device body, thereby allowing the passage of small cables of electric connection of the batteries to said plug.

8. A device according to Claim 2, wherein said device body is formed by a pair of half-shells longitudinally symmetrical to each other with respective caps having hemispherical chambers defining said spherical seat.

9. A device according to Claim 2, wherein said device body is the case of a flashlight.

10. A device according to Claim 2, wherein said device body is removably fixed to a flashlight reflector.

11. A device for connecting rechargeable batteries to an electric socket, substantially as hereinbefore described with reference to the accompanying drawings.